

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

HEAVY USE AREA PROTECTION

(Acre)

Code 561

DEFINITION

Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, and/or by installing needed structures.

PURPOSE

To stabilize urban, recreation or agricultural areas frequently and intensely used by people, animals, or vehicles.

CONDITIONS WHERE PRACTICE APPLIES

On urban, recreational, and agricultural areas or other frequently and intensely used areas that require special treatment to protect them from erosion or other deterioration.

On animal feeding operations where practice is used as a component of a planned waste management system.

CRITERIA

Urban and Recreation Areas

Drainage and erosion control. Provisions shall be made for surface and subsurface drainage, and for control of runoff without causing erosion. All areas disturbed during construction shall be revegetated in accordance with NRCS Conservation Practice Standard *Critical Area Planting (Code 342)*.

Base treatment. All unpaved areas shall have a minimum 6 inch base of KTDH DGA, #8, #610, #57, or #4 stone, or other suitable quarried stone as defined in the construction specifications. All paved areas (**concrete or**

asphalt) shall have a minimum 4-inch base of KYDOH DGA, or if covered with plastic (6-mil minimum thickness), KYDOH #8, #610, or #57 stone.

Areas that support automobile traffic shall be designed for a wheel load of at least 4,000 lbs.

Geotextile. A woven or non-woven geotextile fabric may be required under treatment areas unless the foundation is on rock. The fabric shall have the minimum material requirements as specified in **Tables 1 and 2** of the **Heavy Use Area Construction Specifications**.

Surface treatment. Acceptable surface treatment materials are:

1. Asphalt - The thickness of the asphalt course, the kind and size of aggregate, the type of proportioning of bituminous materials, and the mixing and placing of these materials shall be in accordance with Kentucky DOT specifications for the expected loading.

2. Concrete - Concrete slabs on grade shall consider the required performance and the critical applied loads along with both the subgrade material and material resistance of the concrete slab. Where applied point loads are minimal and liquid-tightness is not required, and the subgrade is uniform and dense, the minimum slab thickness shall be 4 inches with a joint spacing not to exceed 10 feet. Joint spacing can be increased if steel reinforcing is added based on subgrade drag theory. When heavy equipment loads are to be resisted and/or where non-uniform foundation cannot be avoided, an appropriate design procedure incorporating subgrade resistance parameters as contained in American Concrete

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Institute ACI 360, Design of Slabs-on-Grade, shall be used.

3. Surface Aggregate Material - The requirements for surface aggregates are as defined in Agricultural Areas.

If other surfacing materials are used, such as cinders, tanbark, and sawdust, the minimum thickness shall be 2 in.

Structures. All structures shall be designed according to appropriate NRCS Conservation Practice Standards or Engineering Handbook recommendations.

Sprays and artificial mulches. Sprays of asphalt, oil, plastic, manufactured mulches, and similar materials shall be installed according to the manufacturer's recommendations.

Vegetative measures. Liming, fertilizing, seeding, and sodding shall be according to the planned use and NRCS Conservation Practice Standard *Critical Area Planting (Code 342)*. If vegetation is not appropriate, other measures shall be used to prevent erosion.

Agricultural Areas

Because of the manure deposits and buildup associated with animal feeding and loafing areas, all Heavy Use Area Protection treatment areas utilized for these purposes shall only be planned and installed as part of an approved Waste Management System, Code (312).

Solid waste materials shall be periodically removed from the treatment area by scraping, storing, and/or land applying the solid waste materials in accordance with NRCS Conservation Practice Standard, Waste Utilization, Code (633). Treatment areas that require frequent scraping to remove waste materials should have a surface treatment of concrete. The requirements for concrete as described in Urban and Recreation Areas shall be used for Agricultural Areas.

Liquid waste and associated rainfall runoff from the treatment area must be managed in an environmentally acceptable manner. In addition to the Siting Requirements listed in this

standard, other components and/or practices such as diversions, filter strips, waste storage facility, etc. may be required to manage the waste and prevent degradation of air, soil, and water resources, and protect human health and safety.

Treatment area. Recommendations vary on size of heavy use area required for livestock. Recommended treatment area varies from 400 square feet per animal for feedlots to 70 square feet per animal for dairy cows in semi-confined operations. The size of the heavy use area protection is dependent on the landowner's operation including type of animal and time animals are confined. Heavy use areas should be kept as small as practicable.

The recommended treatment areas for loafing areas are as follows:

| Animal ¹ | treatment area / au (ft. ²) | treatment area / animal (ft. ²) |
|---|---|---|
| Dairy Cattle (1.4 au/cow) | 50 | 70 |
| Beef Cattle w/calves (1.5 au/pair) | 50 | 75 |
| Horses (2.0 au/horse) | 35 | 70 |
| Sheep (0.1 au/sheep) | 50 | 5 |
| Animal unit values taken from 40 CFR Part 122 Appendix B. | | |

For travel ways, the minimum width shall be 8 feet and maximum width shall be 15 feet. All travel ways shall be fenced. The fence shall be set at the edge of the travel way.

Base treatment. The requirements for base treatment as described in Urban and Recreation Areas shall be used for Agricultural Areas.

Surface treatment. Surface materials for treatment areas shall be a minimum compacted layer of 2 inches KYDOH #610,

#67, #8, class I sand, or dense grade aggregate (DGA).

Geotextile. A non-woven non-heat bonded and needle-punched geotextile fabric shall be installed under all treatment areas unless the foundation is on rock or concrete is used as the surface treatment. The geotextile fabric shall meet the minimum requirements as specified in **Table 1** of the **Heavy Use Area Construction Specifications**. Use of other geotextiles, (woven) must be approved by the engineer on a case by case basis.

Drainage and erosion control. Provisions shall be made for surface and subsurface drainage, as needed, and for disposal of runoff without causing erosion. All treatment areas shall be shaped to prevent ponding of water. Ramp areas shall be shaped to prevent surface water entry, i.e. by berm installation, etc. All areas disturbed during construction shall be revegetated in accordance with NRCS Conservation Practice Standard, Critical Area Planting, Code 342.

Fencing. Fencing shall be installed as necessary to control all animal traffic. Fencing shall be built in accordance with NRCS Conservation Practice Standard *Fence (Code 382)*.

CONSIDERATIONS

The siting of heavy use areas in agricultural areas should consider existing traffic routes and provide flexibility for future changes in pasture rotation and traffic routing.

Siting Requirements. Heavy use areas for the purpose of feeding livestock should not be located less than 150 feet from any blue line or intermittent stream as defined by the U.S.G.S. 7.5-minute topographic quadrangle. Heavy use areas should not be located within 150 feet of any impounded body of water, or open swallow sinkhole, as determined from onsite investigation by NRCS personnel.

Water Quantity. Heavy use areas will have an affect on the water budget, especially on volumes and rates of runoff, infiltration, and transpiration.

Water Quality. Provisions shall be made to collect and treat polluted runoff.

If heavy use areas are located where polluted surface runoff may be conveyed to a concentrated flow area, impounded body of water, or sinkhole, a filter strip, detention basin, or holding pond shall be installed

PLANS AND SPECIFICATIONS

Plans and specifications for heavy use area protection shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

The Operation and Maintenance (O&M) plan shall specify that the treatment areas and associated practices be inspected annually and after significant storm events to identify repair and maintenance needs.

The O&M plan shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice.

REFERENCES

KY Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction

American Concrete Institute, ACI 360

NRCS Conservation Practice Standards
- Critical Area Planting, Code 342
- Fence, Code 382
- Filter Strip, Code 393

NRCS, NEH 20, Material Specification 592

40 CFR, Part 122, Appendix B

**CONSTRUCTION SPECIFICATION
HEAVY USE AREA PROTECTION
CODE 561**

SCOPE

This item shall include all plans, specifications, construction operations, and vegetation required for the installation of heavy use areas. Construction operations shall be done in such a manner that soil erosion and pollution will be minimized and held within legal limits as specified by state and local laws.

Foundation preparation. All uncompacted, wet, organic or other undesirable materials shall be removed to depths, widths, and lengths as required by the design. The subgrade shall be compacted according to design specifications. All waste materials shall be disposed of in designated areas. All burning shall conform to Kentucky laws and regulations.

Geotextile. The minimum requirements for geotextile shall be as indicated in **Table 1** for non-woven geotextile and **Table 2** for woven geotextile.

Base Course Materials. Aggregates may be crushed stone of KYDOH DGA, #8, #610, #57, or #4 gradation. The base course material shall be thoroughly compacted before application of a surface course treatment.

Surface Aggregate Materials. Surface materials for treatment areas shall be a minimum compacted layer of 2 inches KYDOH class I sand, dense grade aggregate (DGA), #8, #610, or #57 stone. The surface aggregate material shall be spread evenly over the base course material to a minimum depth of 2 inches. The final grade shall be positive to the edges of the heavy use area and outlet onto a vegetative grass buffer.

Protection. Vegetation shall be applied as shown on the plans and specifications. Vegetation shall include seedbed preparation, liming, fertilizing, seeding, and either mulching or netting when needed and specified.

Fencing. Fencing shall be installed as necessary to control all animal traffic and to

positively effect water quality. Fencing shall be built in accordance with NRCS Conservation Practice Standard, Fence, Code 382.

Table 1 - Minimum Requirements for Non - Woven Geotextile

| Property | Test Method | Value |
|---|---------------------------------|-------------|
| Tensile Strength (pounds) ^{1/} | ASTM D 4632 Grab Test | 150 min. |
| Bursting Strength (psi) ^{1/} | ASTM D 3786 Diaphragm Tester | 320 mn. |
| Elongation @ Failure (percent) ^{1/} | ASTM D 4632 Grab Test | > 50 |
| Puncture (pounds) ^{1/} | ASTM D 4833 | 80 min. |
| Ultraviolet Light (% residual tensile strength) | ASTM D 4755 150 hours exp. | 70 min. |
| Apparent Opening Size - AOS | ASTM D 4751 | # 40 max.2/ |
| Permittivity (1/sec) | ASTM D 4491 | 0.70 min. |

Table 2 - Minimum Requirements for Woven Geotextile

| Property | Test Method | Value |
|---|---------------------------------|------------------------|
| Tensile Strength (pounds) ^{1/} | ASTM D 4632 Grab Test | 200 min. any direction |
| Bursting Strength (psi) ^{1/} | ASTM D 3786 Diaphragm Tester | 400 min. |
| Elongation @ Failure (percent) ^{1/} | ASTM D 4632 Grab Test | < 50 |
| Puncture (pounds) ^{1/} | ASTM D 4833 | 90 min. |
| Ultraviolet Light (% residual tensile strength) | ASTM D 4755 | 70 min. |
| Apparent Opening Size - AOS | ASTM D 4751 | # 100 min.2/ |
| Percent Open Area | CWO-02215-86 | 4.0 min. |
| Permittivity (1/sec) | ASTM D 4491 | 0.1 min. |

^{1/} Minimum average roll value (weakest principal direction)

^{2/} U.S. standard sieve size